

Sleep deprivation

Sleep deprivation is a significant hidden factor in lowering the achievement of school pupils, according to researchers carrying out international education tests.

It is a particular problem in more affluent countries, with sleep experts linking it to the use of mobile phones and computers in bedrooms late at night.

Sleep deprivation is such a serious disruption that lessons have to be pitched at a lower level to accommodate sleep-starved learners, the study found.

The international comparison, carried out by Boston College, found the United States to have the highest number of sleep-deprived students, with 73% of 9 and 10-year-olds and 80% of 13 and 14-year-olds identified by their teachers as being adversely affected.

In literacy tests there were 76% of 9 and 10-year-olds lacking sleep.

This was much higher than the international average of 47% of primary pupils needing more sleep and 57% among the secondary age group.

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Other countries with the most sleep-deprived youngsters were New Zealand, Saudi Arabia, Australia, England, Ireland and France. High-performing Finland is also among the most lacking in sleep.

(6) _____ Azerbaijan, Kazakhstan, Portugal, the Czech Republic, Japan and Malta.

The analysis was part of the huge data-gathering process for global education rankings - the Trends in International Mathematics and Science Study (TIMSS) and Progress in International Reading Literacy Study (PIRLS).

These are among the biggest international benchmarks for education standards, based on tests taken by more than 900,000 pupils in primary and secondary schools in more than 50 countries and regional administrations.

The rankings of results for maths, science and reading were published at the end of last year, with Asian education systems dominating the top of the tables.

But the researchers also wanted to find out more about the influence of home life. There has been much analysis of the impact of family wealth and poverty, but the Boston College researchers also wanted to measure factors such as sleep and nutrition.

So the tests were accompanied by questionnaires for teachers, pupils and parents about sleep patterns. And this information was compared with pupils' test results, so that the performance in maths, science and literacy could be compared with levels of sleep.

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"I think we underestimate the impact of sleep. Our data show that across countries internationally, (7) _____, science and reading. That is exactly what our data show," says Chad Minnich, of the TIMSS and PIRLS International Study Center.

"It's the same link for children who are lacking basic nutrition," says Mr Minnich, based at the Lynch School of Education, Boston College.

"If you are unable to concentrate, to attend mentally, you are unable to achieve at your optimal level, because your mind and body are in need of something more basic.

"Sleep is a fundamental need for all children. If teachers report such large proportions of children suffering from lack of sleep, it's having a significant impact.

"But worse than that, teachers are having to modify their instruction based on those children who are suffering from a lack of sleep.

"The children who are suffering from a lack of sleep are driving down instruction."

That means that even the children who are getting enough sleep are still suffering from this sleep-related dumbing-down.

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The researchers uncovered regional trends that bucked expectations.

Asian countries are the highest-performing in maths tests - and Mr Minnich says this has

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often been associated with long hours and cramming in after-school classes.

"One would assume that they would be extremely tired," he said. "And yet when we look at the sleep factor for them, they don't necessarily seem to be suffering from as much sleep deprivation as the other countries."

(8) _____. For instance, the least sleepy pupils seem to be in Azerbaijan, but they are still considerably behind the most sleep-deprived pupils in Finland.

But researchers say that it does show how differently individual pupils might be placed on the ability spectrum, with lack of sleep representing the difference between being high-performing and average.

There are also big changes as pupils get older. Younger pupils in South Korea have among the lowest levels of sleep deprivation in the world, but in secondary school they have some of the worst problems.

There are differences within countries too. At the level of US states, among secondary pupils Colorado has a much worse problem with lack of sleep than Massachusetts.

What the study does not show is why young people are missing out on sleep - or why more technologically advanced countries seem to have the biggest difficulties.

But sleep experts point to a particular problem due to technology in children's bedroom - specifically the use of screens on smartphones or laptops late at night.

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It isn't only that young people are kept awake by messaging their friends or using the internet. The light from the screen, held close to the face, is physically disruptive to the natural onset of sleep.

"Having a computer screen that is eight inches away from your face is going to expose you to a lot more light than watching a television on the opposite side of the room," says Karrie Fitzpatrick, sleep researcher at Northwestern University in Illinois.

"It's going to tell your brain to stay awake," says Dr Fitzpatrick.

"That light can reset the whole circadian rhythm system and say, 'Wait a minute, it's not time to go to bed'."

(9) _____ "Sleepiness is a problem at all stages that are relevant to learning, memory and academic performance," says Derk-Jan Dijk, director of the Sleep Research Centre at the University of Surrey.

Research into sleep disorders and brain function has shown the importance of sleep in memory and consolidating information.

Without sleep, the brain struggles to absorb and retain ideas.

"There is a growing interest in the associations between adequate sleep and academic performance," says Prof Dijk.

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Dr Fitzpatrick says lack of sleep is going to leave pupils more emotionally volatile, more potentially disruptive and physically struggling to learn.

And she says that the loss of sleep and short-term attempts to catch up can cause further and complex disruptions to the way the brain tries to store information.

But there is good news. (10) _____, the loss to learning can be reversed.

"As long as you haven't gone into extreme sleep deprivation, if you go back to seven to nine hours per night, as long as there has been no permanent damage, you can probably restore the functionality of accumulating, processing and being able to recall memories," says Dr Fitzpatrick.

"The basis of learning will likely be restored to normal levels."

Otherwise trying to study without sleep is going to be tough. "Your brain is running on empty."

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Match the headings with the paragraph.

- A. Brain food
- B. Achievement gap
- C. 'Loss can be reversed'
- D. Cramming school
- E. Serious barrier to learning
- F. Excessive television

1.	2.	3.	4.	5.
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Match the sentence to the gap in the text.

- G. If you start getting enough sleep on a regular basis...
- H. Getting a good night's sleep isn't going to transform an underperforming country into an education superpower.
- I. Lack of sleep is also a serious physical barrier to learning.
- J. Countries with the best records for getting enough sleep include...
- K. ...on average, children who have more sleep achieve higher in maths...

6.	7.	8.	9.	10.
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Answer the following questions with True (T) or False (F).

- 11. The majority of students who were sleep deprived come from America. T / F
- 12. The best test scores for math and science were from western countries. T / F
- 13. Teachers have to adapt their lessons to appeal to sleepy students. T / F
- 14. Azerbaijan has some of the best performing students. T / F
- 15. South Korean students are some of the best rested. T / F
- 16. Light from electronic devices can keep students wake. T / F
- 17. Damage from lack of sleep cannot be fixed. T / F
- 18. The article comes from an unreliable source. T / F
- 19. Do you agree or disagree with anything in this article? Why / Why not? _____
